

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An actuating device ~~for manually actuating~~configured to manually actuate a driving and steering means-mechanism for a wheeled, power driven object or vehicle, said actuating device comprising:

a base member;

an actuating member having gripping means and being supported by the -base member so as to be displaceable ~~thereon~~relative to the base member in along at least one plane;

at least first and second force transducers, the first transducer being arranged to receive a force component manually applied to the actuating member in a ~~predetermined~~ first direction ~~only~~, along within said plane, and the second force transducer being arranged to receive a force component manually applied to the actuating member in a ~~predetermined~~ second direction ~~only~~, the second direction being transversely to the first direction along and within said plane, wherein

each of said at least first and second force transducers ~~being~~are adapted to generate an output signal ~~to~~for the driving and steering ~~means-mechanism~~ responsive to the strength of the force component received.

2. (Currently Amended) An actuating device according to claim 1, wherein said ~~predetermined~~ first and second directions extend at mutual right angles.

3. (Currently Amended) An actuating device according to claim 1 ~~or 2~~, wherein said first ~~predetermined~~ direction extends in the normal direction of travel of the vehicle.

4. (Currently Amended) An actuating device according to ~~any of the claims 1-3~~claim 1, wherein said gripping means comprises a pair of ~~mutually spaced~~ gripping handles, ~~which are fixedly~~the gripping handles being mounted on the actuating member and symmetrically arranged about a line along the first direction midway between the gripping handles in relation to said first ~~predetermined~~ direction, said first force transducer and a similar third force transducer being arranged symmetrically about a line along the first direction midway between the first and third ~~force transducers in relation to the said first predetermined direction~~, said third force transducer

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~~being arranged like the and said first force transducer being arranged~~ to receive a force component manually applied to the actuating member in said ~~predetermined~~ first direction, ~~only~~.

5. (Currently Amended) An actuating device according to ~~any of the claims 1-4~~claim 1, wherein each force transducer is ~~fixedly mounted in relation to~~ the base member, each force transducer having a force transmitting member extending into and engaging with the walls of an associated recess in the actuating member, said recess being shaped such that substantially only a force component in the ~~said predetermined direction~~ associated with the transducer may be transmitted from the actuating member to the force transducer via said transmitting member.

6. (Currently Amended) An actuating device according to ~~any of the claims 1-5~~claim 1, wherein the force transducers each comprise a strain gauges.

7. (Currently Amended) An actuating device according to claim 6, wherein each force transducer comprises a cantilever beam having one or more strain gauges mounted thereon, ~~the force component from the~~ actuating member being applied configured to apply a force to the free end of the beam so as to generate bending stresses in the beam ~~therein~~.

8. (Currently Amended) An actuating device according to ~~any of the claims 1-7~~claim 1, wherein the actuating member is freely configured to floating on a liquid film or layer.

9. (Currently Amended) An actuating device according to claim 8, wherein said liquid film or layer is comprises a layer of viscous oil or grease.

10. (Currently Amended) An actuating device according to claim 9, wherein the liquid film or layer is comprises a layer of damping grease.

11. (Currently Amended) An actuating device according to ~~any of the claims 1-10~~claim 1, further comprising an electronic circuit for receiving configured to receive the output signals from the force transducers and for processing these to process the output signals prior to transmitting them to the driving and steering system of the vehicle, so as to obtain substantially the same vehicle movement of greater magnitude than if the vehicle of the vehicle as if it had been manually driven by the forces applied to the gripping means, ~~but in an intensified scale~~.

12. (Currently Amended) A method ~~for~~ of manually actuating a driving and steering means-mechanism for a wheeled, power driven object or vehicle, said method comprising:
applying a manual force to an actuating member;

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decomposing the manual force into at least two components extending in mutually intersecting, ~~predetermined~~ directions;

applying each of said force components to a respective transducer; and

transmitting from each of said transducers to the steering ~~system-mechanism~~ an output signal, ~~which is responsive to the strength of the force component received by the transducer relating to the respective direction.~~

13. (Currently Amended) A method according to claim 12, wherein the manual force is applied to gripping means provided on the actuating member, ~~which is the actuating member being supported by a base member so as to be freely displaceable thereon along a plane in said predetermined directions within a plane only.~~

14. (Currently Amended) A method according to claim 12 ~~or 13~~, wherein said ~~predetermined~~ directions extend at mutual right angles.

15. (Currently Amended) A method according to ~~any of the claims 12 — 14~~ claim 12, wherein one of said ~~predetermined~~ directions extends in the normal direction of travel of the vehicle.

16. (Currently Amended) A method according to ~~any of the claims 13 — 15~~ claim 13, wherein the actuating member is ~~freely configured to floating~~ on a liquid film or layer.

17. (Currently Amended) A method according to claim 16, wherein said liquid film or layer ~~is a layer of~~ comprises viscous oil or grease.

18. (Currently Amended) A method according to claim 17, wherein the liquid film or layer ~~is a layer of~~ comprises damping grease.

19. (Currently Amended) A method according to ~~any of the claims 12 — 18~~ claim 12, wherein the transducer stiffness and the mass of the control plate ~~are combined so as to obtain~~ define a natural frequency of resonance of the movable parts of the actuator device substantially exceeding frequencies of environmental vibrations.

20. (Currently Amended) A method according to claim 18 ~~or 19~~, wherein the liquid layer is arranged so as to provide one of about critical or and about just overcritical damping of the natural free resonance vibrations.

21. (Currently Amended) A method according to ~~any of the claims 12 — 20~~ claim 12, wherein the output signals from the transducers are configured to be transmitted to an electronic

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circuit, in which ~~these~~ the output signals are processed prior to further transmitting them to a driving and steering system of a wheeled vehicle; so as to obtain ~~substantially the same vehicle movement of greater magnitude of the vehicle as than if it~~ the vehicle had been manually driven by the force applied to the actuating member, ~~but in an intensified scale.~~

22. (Currently Amended) A drive wheel system for ~~supporting and driving configured to drive~~ an object, said wheel system comprising:

at least two separate wheeled units or bogies ~~to be mounted~~ at selected locations on the object to support the ~~same~~ object, each wheeled unit or bogie ~~including comprising:~~

a frame, wherein at least one wheel member is rotatably mounted in relation to the frame;

a driving means-mechanism configured to rotate for rotating the wheel member(s) in relation relative to the frame; and

a steering means-for moving-mechanism configured to move the wheel member(s) in desired directions in relation relative to the frame;

an electronic control means-for controlling-unit configured to control the function of the driving mechanism and the steering mechanism means-of each of said wheeled units or bogies, the electronic control unit comprising: and including

a pre-programmed bogie-control device at each of said wheeled units or bogies;

a signal transmitter; and ing means, and

a pre-programmed central control unit ~~for outputting~~ configured to output command signals to each of the pre-programmed bogie-control devices via the signal transmitter-ing means in response to input command signals; and-received, and

an actuating device according to ~~any of the claims 1-11~~ claim 1, the output signals generated by the transducers ~~-being~~ configured to be transmitted to the electronic control unit means.

23. (Currently Amended) A system according to claim 22, wherein the central control unit comprises a first programming means-for inputting-device configured to receive information about the mutual positions of the wheeled units or bogies on said object.

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24. (Currently Amended) A system according to claim 22 ~~or 23~~, wherein each bogie control device comprises a second programming means for inputting device configured to receive information about the orientation of the associated wheeled unit ~~in relation to~~ about a selected common axis, ~~when mounted on said object.~~

25. (Currently Amended) A system according to ~~any of the claims 22 -- 24~~ claim 22, wherein the signal transmitter ~~ing means~~ comprises a galvanic isolating device.

26. (Currently Amended) A system according to claim 25, wherein the galvanic isolating device comprises an optocoupler.

27. (Currently Amended) A system according to ~~any of the claims 22 -- 26~~ claim 22, wherein the central control unit comprises ~~means for transforming a~~ data converter configured to convert output command signals to be transmitted to the bogie control devices at the wheeled units or bogies into serial digital ~~signals.~~ strings.

28. (Currently Amended) A system according to ~~any of the claims 22 -- 27~~ claim 22, wherein the ~~electronics of the electronic control means is divided between the central control unit on the one hand and each of the bogie control devices each comprise a portion of the electronic control unit on the other hand so as to minimize data transmission via the signal transmitting means.~~

29. (Currently Amended) A system according to ~~any of the claims 22 -- 28~~ claim 22, wherein the driving mechanism and the steering mechanism ~~means~~ of the wheeled units or bogies each comprise a motors selected from the group consisting of electric motors, hydraulic motors, pneumatic motors, steam engines, thermodynamic engines, and internal combustion engines.

30. (Currently Amended) A system according to ~~any of the claims 22 -- 29~~ claim 22, wherein the wheeled units or bogies of the system are substantially identical.

31. (Currently Amended) A system according to ~~any of the claims 22 -- 30~~ claim 22, wherein each wheel member ~~is of the type comprising~~ comprises a support member, a wheel element, and a drive shaft, the drive shaft ~~having a drive means engaging a drive surface on the wheel element and is configured to rotatably drive the wheel element relative to the support member, the drive shaft having comprising a longitudinal axis, and wherein the engagement of the drive means shaft and the drive surface defining defines~~ in vertical cross-section a line of

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engagement that is at an acute angle with respect to the longitudinal axis, the wheel element ~~having-comprising~~ a surface contacting portion extending about its periphery and being positioned such that ~~it-the wheel element~~ is intersected by the line of engagement substantially at where ~~it-the wheel element~~ contacts a supporting surface.

32. (Currently Amended) A system according to claim 31, wherein the drive shaft is substantially normal to the supporting surface.

33. (Currently Amended) A system according to claim 31 ~~or 32~~, wherein the ~~line-of engagement is at an angle of-is~~ between about 10° and about 25°, ~~to the substantially normal longitudinal axis of the drive shaft.~~

34. (Currently Amended) A system according to ~~any of the claims 31-33~~ claim 31, wherein the support member ~~has-comprises~~ a substantially hemispherical member ~~outer surface with-and~~ the wheel element is rotatable about an axle extending normal to an inner surface of the hemispherical member.

35. (Currently Amended) A method of rendering an object self-propelling ~~by-means of-with~~ a drive wheel system according to ~~any of the claims 24-34~~ claim 24, said method comprising:

mounting at least two of said wheeled units or bogies on the object at selected locations thereof and with selected orientations ~~in-relation~~ relative to a certain direction;

programming said first programming ~~means-device~~ by inputting information about the ~~mutual~~ positions of the wheeled units or bogies on said object;

programming said second programming ~~means-device~~ by inputting information about the orientation of the associated wheeled unit ~~in-relation~~ relative to a selected direction, and

inputting command signals to the central control unit ~~by-means offrom~~ the actuating device so as to move the vehicle along a desired path.

36. (Currently Amended) A method according to claim 35, comprising ~~basing-relating~~ the information about the ~~mutual~~ positions of the wheeled units or bogies ~~in-relation-to~~ an actual or imaginary co-ordinate system on said object.

37. (Currently Amended) A method according to claim 36, wherein said selected direction is parallel to one of the axes of the co-ordinate system.

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38. (Currently Amended) A method according to ~~any of the claims 35 — 37~~claim 34, wherein the electronic control ~~means are unit~~ is pre-programmed to ensure that the steering ~~means are mechanism~~ movesing all wheel members of the wheeled units or bogies mounted on the ~~said~~ object such that any time during driving all wheel members are either moving along substantially parallel lines or substantially concentric arcs of circles.

39. (Currently Amended) A method according to ~~any of the claims 35 — 38~~claim 35, wherein the command signals are transmitted from the central control unit to the ~~bogie~~ control devices at the wheeled units or bogies as serial digital ~~signals~~ strings.

40. (Currently Amended) A method according to ~~any of the claims 35 — 39~~claim 35, wherein the object to be rendered self-propelled is a manually driven vehicle having a plurality of supporting wheels, wherein at least ~~some of these two supporting wheels~~ being ~~are~~ replaced ~~so as to have such that~~ the vehicle is supported by at least two of said wheeled units or bogies and freely swivelling wheels or casters only.

41. (Currently Amended) A method according to ~~any of the claims 35 — 40~~claim 35, wherein the ~~central~~ electronic control unit is mounted on the object.